

CLAIMS

1. A rubber composition comprising 100 parts by mass of a rubber and
5 0.1 to 100 parts by mass of carbon fibers as a filler which are produced by a
vapor phase epitaxial growth method and respectively include one or more
bottomless cup-shaped carbon network layers, wherein the respective carbon
network layer in the form of stacked cups have a large diameter portion whose
end face is exposed onto a periphery of the carbon fiber.

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2. The rubber composition according to claim 1, wherein said filler
includes the carbon fibers produced by a vapor phase epitaxial growth method
which respectively include a plurality of the bottomless cup-shaped carbon
network layers stacked on each other.

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3. The rubber composition according to claim 2, wherein said carbon
fiber has a knotless (bridge-free) hollow shape.

4. The rubber composition according to claim 3, wherein the hollow
20 carbon fibers include a hollow portion having outside and inside surfaces onto
which end faces of the carbon network layer are exposed.

5. The rubber composition according to claim 4, wherein 2% or more of
the end face of the carbon network layer which is located on the outside surface
25 of the hollow portion of the carbon fiber, is exposed thereto.

6. The rubber composition according to claim 4 or 5, wherein the exposed
end face of the carbon network layer has irregularities on a scale of atomic
level.

7. The rubber composition according to any of claims 1 to 6, wherein the carbon network layer remains ungraphitized even when it is heat-treated at a high temperature of 2,500°C or higher .

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8. The rubber composition according to any of claims 1 to 7, wherein the carbon fibers have diameters of 1 to 1,000 nm and lengths of 0.1 to 1,000 μm .

9. The rubber composition according to any of claims 1 to 7, wherein the
10 carbon fibers have diameters of 5 to 500 nm and lengths of 0.5 to 750 μm .

10. The rubber composition according to any of claims 1 to 7, wherein the carbon fibers have diameters of 10 to 250 nm and lengths of 1 to 500 μm .

15 11. The rubber composition according to any of claims 1 to 10, further comprising a filler other than the carbon fibers in an amount of 1 to 60 parts by mass.

20 12. The rubber composition according to claim 11, wherein the filler other than the carbon fibers is carbon black and/or an inorganic filler.

13. A tire using the rubber composition as claimed in any of claims 1 to
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